

CA-IR-28

**HECO ST-4, Page 6 through 8.**

Regarding the Effectiveness of the Kamoku 46 kV Alternative Expanded With the Proposed Changes, please answer the following questions:

- a. Upon completion of Phase 1, how much Pukele load (percentage and MW) will be able to be backed up from other substations should both 138 kV lines feeding Pukele substation be out of service?
- b. For the remaining Pukele load that cannot be backed up after completion of Phase 1, how would HECO define the "importance" of this load? Please identify some of the loads that would not be backed up after Phase 1 completion.
- c. Upon completion of Phase 2, how much Pukele load (percentage and MW) will be able to be backed up from other substations should both 138 kV lines feeding Pukele substation be out of service?
- d. If some Pukele load is not backed up during the period of Phase 1 completion and Phase 2 completion, why is HECO not installing both phases at this time to provide the same level of reliability to all of the Pukele loads?

**HECO Response:**

- a. At the time of the 2002 Day Peak, the Pukele Substation load was 196 MW, including the various adjustments explained in response to CA-IR-11. Upon completion of Phase 1, approximately 41% or 80 MW of load served by the Pukele Substation will be shifted to the Kamoku and Archer Substations and, therefore, should not experience an interruption of service if both 138kV lines feeding the Pukele Substation are out of service. An additional 32% or 63 MW of load, which will still be served by the Pukele Substation once Phase 1 is installed, will be backed up by the Archer, Kamoku and Koolau Substations, and will experience an interruption of service lasting up to 6 seconds. The last 27% or approximately 53 MW of load served by the Pukele Substation would be manually switched to the Koolau Substation if there is an extended outage of the Pukele Substation. Manual transfers would

require HECO personnel to go to various locations to manually switch the loads, which is estimated to take up to two to four hours. Therefore, Phase 1 would provide partial back-up to 73% or 104 MW of the Pukele Substation load using the Pukele Substation load at the time of the 2002 Day Peak, as adjusted.

- b. All of the load served by the Pukele Substation will have alternate feeds from the Archer, Kamoku and Koolau Substations, however, after the installation of Phase 1, approximately 27% or 53 MW of load will experience an interruption of service for two to four hours. The 27% or 53 MW include the Kahala, Waialae, Pukele, Manoa, Woodlawn, UH Quarry and East-West Center distribution substations. These substations serve loads such as the residential customers for these areas and the University of Hawaii. It is important to HECO to be able to minimize the interruption of service to these loads and, therefore, HECO is proposing to implement Phase 2 of the project.
- c. Upon completion of Phase 2, approximately 41% or 80 MW of the Pukele load (based on the Pukele Substation load at the time of the 2002 Day Peak with adjustments) will be shifted to the Archer and Kamoku Substations and should not experience an interruption of service if the two 138kV lines feeding the Pukele Substation are out of service. Approximately 59% or 116 MW will be backed up from the Archer, Kamoku and Koolau Substations, and would experience an interruption of service lasting up to 6 seconds.
- d. The Kamoku 46kV Underground Alternative – Expanded is being proposed to address a number of transmission problems including the Pukele Reliability Concern and the Koolau/Pukele Overload Situation. As explained in HECO T-6 (page 18), HECO is pursuing a phased project because a major advantage in the two-phase project for the Kamoku 46kV Underground Alternative – Expanded is that the schedule uncertainties are

reduced for Phase 1 by separating much of the permitting, engineering and construction activities of Phase 1 from those of Phase 2. It is important to reduce the schedule uncertainty because the completion of Phase 1 in mid-2007 (HECO ST-6, page 4) would more timely address the potential Koolau/Pukele Overload Situation, which is forecasted to occur in 2005. The schedule for the Kamoku 46kv Underground Alternative (HECO T-6, page 15; HECO-602, pages 23-25; HECO 802), the Kamoku 46kv Underground Alternative-Expanded (HECO T-6, page 16, HECO-602, pages 30-33; HECO-803), and the 46kv Phased Project (HECO T-6, pages 18-19; HECO-602, pages 33-38; HECO-804), and the advantages of the Phased Project over the 46kv Underground Alternative-Expanded (in which both phases, in effect, are done at the same time), are addressed at length in the testimonies and exhibits. The schedule impacts addressed in HECO-ST-6 (and in HECO-ST-601) would affect all of the alternatives.